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THE EFFECT OF TECHNOLOGY APPLICATION IN DIGITAL SUPPLY CHAIN ON COMPANY OPERATIONAL PERFORMANCE

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ABSTRACT

Technology development today is increasingly rapid in various aspects of human life activities. This allows everyone to access various information easily and quickly through the internet. Technology is also applied to organizations or enterprises for operational effectiveness and efficiency. This study aims to study the influence of digitalization, supply chain management, and technology implementation in the digital supply chain on quality, Productivity, and cost reduction in aspects of operational performance. This research uses quantitative methodology and data from various industries that apply digital supply chains. Data from a survey of 162 respondents were analyzed using the Partial Least Square (PLS)-based SEM method. Research reveals that digitalization, supply chain management, and technology implementation in the digital supply chain positively influence quality, Productivity, and cost reduction in operational performance.

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1. INTRODUCTION

Today the world community prefers to use digital tools and devices to communicate and interact with family, friends, and others. Market forecasting by Bearing Point (2015) shows that a quarter of the world's population is currently connected to the internet, of which half are active on social media *platforms* (Lee, Azmi, Hanaysha, Alzoubi, & Alshurideh, 2022).

The supply chain can be defined as a set of related activities involving the coordination, planning, and control of products and services between suppliers and customers (Büyüközkan & Göçer, 2018). Every organization or company will always strive to carry out operations effectively and efficiently.

Research suggests that executives can benefit by adopting appropriate digital technologies in the supply chain [3]. The new concept in Digital supply chain management is the "*Internet of Things.*" Refers to the trend where everyday tools and objects are interconnected with the internet (Huddar, Kumatagi, & Latte, 2017). More than 90% of internet users shop online, and more than 40% of companies use the latest technology for big data analysis. Based on research (Men, Yaqub, Yan, Irfan, & Fatima, 2022), digital supply chains have an important role in company performance and positively influence company performance. Of course, Digital supply chains integrate innovative technologies (e.g., *Augmented Reality, Big Data, Blockchain*) focusing on customers/consumers, reducing intra- and inter-organizational costs and creating higher organizational value (Ageron, Bentahar, & Gunasekaran, 2020). Cloud Computing, in combination with the use of machine learning, IoT, and *blockchain* technology, can create more opportunities for the logistics and supply environment [7]. Five main factors: technology, digitalization, integration, collaboration, and coordination, influence the emergence of digital supply chains (Iddris, 2018).

The digitization process allows organizations to control and operate commerce digitally and the basic functions involved in the trading process (Saengchai & Jermsittiparsert, 2019). Digitalization is described as using digital technology and shifting ordinary business to digital business, leading to new revenue transformation [10].

Supply chain management can be said to be a company strategy for managing every business process related to the delivery of goods from suppliers to customers (Ilham, Eliyana, Usman, Idham, & Risma, 2020). The definition can say the quality of customer satisfaction, while Productivity is a comparison between the output produced and the input used to produce the output (Lores & Siregar, 2019). Previous research by Saryatmo and Sukhotu with the journal title "*The Influence of the Digital Supply Chain on Operational Performance: A Study of the Food and Beverage Industry*" in 2021 confirmed that digital supply chains have a positive influence on quality performance, Productivity, and cost reduction (Saryatmo & Sukhotu, 2021).

2. METHOD

This study will use quantitative data to test hypotheses and examine the variables' relationship. The strategy in this study is a survey where questionnaires are a data collection tool. This survey was conducted to determine the effect of the application of technology on the supply chain on the company's operational performance.

Samples from the population will be taken based on criteria, namely company employees from various industries that implement digital supply chains or use technology in office operations. This study consists of 3 variable groups: independent variables consisting of digitalization, supply chain management, and technology implementation; Mediation variables consisting of digital supply chains; and dependent variables consisting of quality, Productivity, and reduced operational costs.

The measurement in this study used a 5-point Likert scale by measuring variables into indicators. Then the indicator is used as the basis for the question or statement on the questionnaire until the statement will later produce a conclusion. The population in this study are employees who work in various industries in various regions of Indonesia and who implement digital supply chains. Data processing techniques in this study use the SEM method based on Partial Least Square (PLS). PLS is a multivariate technique that can simultaneously manage various things such as response and explanatory variables [14]. The general form of PLS (Partial Least Square) is essentially a factor analysis of an nxq-sized bound variable matrix (response) and a factor analysis of an nxp-sized matrix of free variables (predictors) [15].

3. RESULT AND DISCUSSION

Of the 161 respondents, 75.3% worked for a company with a Limited Liability Company (PT), 15.4% of respondents worked for Venootschap (CV), and 9.3% worked for an individual company. The educational background of respondents was 35.8% high school/diploma, and 64.2% graduated from Strata 1 (S1). From the loading factor test, it was produced that the indicator has a loading factor value of >0.7, so it is said that the indicator is valid so that the constructs for all variables are no longer eliminated from the model.

Table 1 Composite Reliability Variables

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Digitalisasi	0.774	0.778	0.856	0.598
Implementasi Teknologi	0.818	0.818	0.880	0.646
Kualitas	0.770	0.775	0.853	0.592
Manajemen Rantai Pasok	0.737	0.738	0.835	0.559
Pengurangan Biaya	0.795	0.802	0.867	0.620
Produktivitas	0.789	0.791	0.864	0.615
Rantai pasok digital	0.895	0.898	0.916	0.578

Table 1 shows that there is a composite *reliability* variable test. The *composite reliability* value for all constructs on the variable is above 0.7, which indicates that all constructs on the estimated model meet the *discriminant validity* criteria. In addition, all Average Variance Extracted (AVE) values > 0.50 and all values of Cronbach's Alpha (α) > 0.70, so all variables are said to be reliable.

Based on the results of discriminant validity testing after model modification, all indicators have a cross-loading value against their construct greater than the cross-loading value against other constructs, so it is declared valid. It can be concluded that all constructs have good discriminant validity.

Internal model testing is carried out to see the research model's relationship between constructs, significant values, and R-squares. In Figure 2, The structural model is evaluated using R-Square for the dependent construct of the t-test and the significance of the structural path parameter coefficient.

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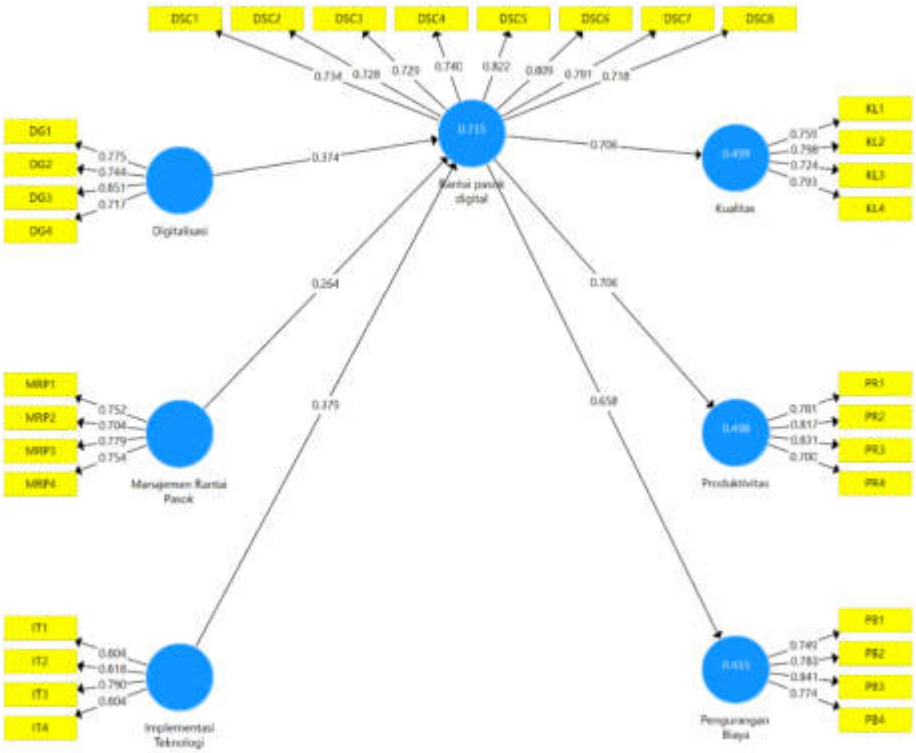

Figure 1 Structural Model

Assessing a model with PLS begins by looking at the R-Square for each latent dependent variable. Table 2 is the result of R-Square estimates using SmartPLS. The R-square value for the Quality variable was obtained at 0.499. These results show that 49.9% of Quality variables can be affected by digital supply chain variables.

The R-square value for the Cost Reduction variable was obtained at 0.433. These results show that digital supply chain variables can affect 43.3% of Cost Reduction variables. The R-square value for the Productivity variable was obtained by 0.498. These results show that 49.8% of Productivity variables can be affected by digital supply chain variables. The R-square value for the digital supply chain variable was obtained at 0.735. These results show that 73.5% of digital supply chain variables can be affected by Digitalization, Technology Implementation, and Supply Chain Management Quality.

Table 2 R-Square Values

	R Square	R Square Adjusted
Quality	0.499	0.496
Cost Reduction	0.433	0.430
Productivity	0.498	0.495
Digital supply chain	0.735	0.730

Predictive relevance (Q^2) testing is performed to validate the model. Based on the results of predictive *relevance* (Q^2) calculations, it shows a value of 0.962. In this research model, endogenous latent variables have a greater predictive relevance (Q) value and 0 (zero), so exogenous latent variables as explanatory variables can predict their endogenous variables or prove that this model is considered to have good *predictive relevance*.

Table 3 Hypothesis Test

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics	P Values

				(|O/STDEV|)	
Digitalization -> Digital supply chains	0.374	0.374	0.056	6.704	**0.000**
Implementation of Digital Supply Chain > Technology	0.379	0.377	0.052	7.246	**0.000**
Supply Chain Management -> Digital supply chains	0.264	0.268	0.060	4.397	**0.000**
Digital supply chain -> Quality	0.706	0.712	0.036	19.627	**0.000**
Digital supply chain -> Cost Reduction	0.658	0.663	0.039	16.682	**0.000**
Digital supply chain -> Productivity	0.706	0.711	0.035	20.046	**0.000**

4. CONCLUSION

The original sample estimate value is positive at 0.374, indicating that the direction of digitalization positively affects the digital supply chain. Thus hypothesis 1 in the study is accepted. Digitalization has a positive influence on digital supply chains. The original sample estimate value is positive at 0.264, which indicates that the direction of influence of Supply Chain Management on the digital supply chain is positive. Thus hypothesis 2 in the study is accepted. Supply Chain Management has a positive influence on digital supply chains. The original sample estimate value is positive at 0.379, indicating that the direction of influence of Technology Implementation on the digital supply chain is positive. Thus hypothesis 3 in the study is accepted. Technology implementation has a positive influence on digital supply chains. The original sample estimate value is positive at 0.706, which indicates that the direction of influence of the digital supply chain on quality is positive. Thus hypothesis 4 in the study is accepted. The digital supply chain has a positive influence on quality. The digital supply chain has a positive influence on the Productivity of machinery and company workers. The original sample estimate value is positive at 0.658, which indicates that the direction of influence of the digital supply chain on Cost Reduction is positive. Thus hypothesis 5 in the study is accepted. Digital supply chains have a positive influence on Cost Reduction. The original sample estimate value is positive at 0.706, which indicates that the direction of influence of the digital supply chain on Productivity is positive. Thus hypothesis 6 in the study is accepted. Digital supply chains have a positive influence on Productivity

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